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Dear Gian Carlo,

Thank you for your fax dated 30ᵗʰ October. There is much in the new draft that I am happy to agree with, but there are a few points I would like to raise with you, for additional clarification.

① An essential part of your argument is that, modulo a 'no-conspiracy' assumption, then   OM-LOC ⊃ B-LOC (1)
(Sect. 4·ii of your paper)

From (1) you argue (Sect. 6·1)

$$Q.M. \wedge Compl. \supset \neg B\text{-}LOC$$
$$\supset \neg OM\text{-}LOC, \quad from (1).$$

But then, from the basic result

$$Q.M. \wedge Compl. \supset \neg (OM\text{-}LOC) \vee \neg (FR\text{-}LOC)$$
(your 5.2)

it follows that we cannot derive ¬(FR-LOC)

P.T.O.

and hence, by employing your notion of 'accessible' properties, you can move to the claim that $E \text{-} LOC$ holds.

I want to look at (1) a bit more carefully.

Since $B\text{-}LOC \equiv P.I. \wedge O.I.$

(1) can be rewritten as

$$O.M\text{-}LOC \supset P.I. \wedge O.I.$$

from which it follows that

$$O.M\text{-}LOC \supset P.I. \qquad (2)$$

and $$O.M\text{-}LOC \supset O.I. \qquad (3)$$

Now (2) needs no 'no-conspiracy' assumption to justify it. (2) just says that if outcomes match on each occasion when the distant measurement is performed, as compared with the situation when it is not performed, then there must be a corresponding match in the probabilities interpreted as long-run frequencies in the two situations.

But remembering that

$$Q.M. \wedge Compl. \supset P.I \qquad (4)$$

and $$Q.M. \wedge Compl. \supset \neg O.I \qquad (5)$$

it is (3) we must look at, not (2) for your argument to go 'through'.

Now it is not at all clear to me how to justify (3) by using a 'no-conspiracy' assumption.

OM-Loc is concerned ~~is concerned~~ with comparing outcomes when a distant measurement is or is not performed. But O.I. is a 'screening off' condition between the outcomes of two measurements which are actually performed

I simply do not see how to connect one principle with the other.

If we revert for a moment to (2), then one could use a no-conspiracy argument to justify

$$P.I. \supset OM\text{-}Loc \qquad \qquad (6)$$

The situation here is exactly like the relationship between STAT FUNC and FUNC (see my book, <u>Incompleteness, Nonlocality</u> <u>and Realism</u>, p.132). We cannot derive FUNC from STAT FUNC, unless we use some assumption to the effect that probabilistic matching can only be expected to occur if matching occurs case by case.

P.T.O.

But if we combine (4) and (6) then we would conclude

$$QM \wedge Compl. \supset OM-LOC$$

which, in conjunction with your 5.2 would imply

$$Q.M. \wedge Compl. \supset \neg (ER-LOC)$$

the very result you don't want!

Now, I am not advocating this line of argument. In the case of STAT FUNC and FUNC it leads to disaster, since STAT FUNC is a theorem of quantum mechanics and FUNC leads to logical contradiction (the Kochen-Specker paradox).

But the point for our paper, Gian Carlo, is that we must be very careful not to license (6) rather than (3) by a no-conspiracy line of argument, and at the moment I don't see how to do this.

④ Even if we have succeeded in demonstrating ER-LOC, we still have to explain why $\neg OM-LOC$ is not a difficulty for relativity.

clearly → OM-Lore implies a form of <u>parameter dependence</u> at a case-by-case level, while preserving the probabilistic version of P.T. itself. This again could be argued to involve a conspiracy, viz. 'if case-by-case, parameter independence fails, then how does it come about that the long-run frequencies are unchanged?' 'No-conspiracy' arguments have a habit of justifying things you don't want as well as things you do want!

I am eager to have your reactions to these comments.

With best wishes

Michael